in detail with reference to the accompanying drawings. In the drawings, like reference numerals refer to like elements, and the thicknesses of layers and regions may be exaggerated for clarity. In this regard, the present exemplary embodiments may have different forms and should not be construed as being limited to the descriptions set forth herein. Accordingly, the exemplary embodiments are merely described below, by referring to the figures, to explain aspects. In the description below, when it is described that a certain layer is provided "on", "on an upper part of", or "above" a substrate or another layer, the certain layer may be in direct contact with and above the substrate or another layer, or a third layer may be interposed therebetween. As used herein, expressions such as "at least one of," when preceding a list of elements, modify the entire list of elements and do not modify the individual elements of the list.

[0047] FIG. **1** illustrates a block diagram of an image acquisition apparatus according to an exemplary embodiment. FIG. **2** illustrates an optical configuration applied to the image acquisition apparatus of FIG. **1**, according to an exemplary embodiment.

[0048] Referring to FIGS. **1** and **2**, the image acquisition apparatus may include an optical path modulation optical element **10**, an image sensor **150**, and a signal processor **1300**. The optical path modulation optical element **10** may be turned on or off based on a voltage applied from a driver **1200**. The image sensor **150** may include a color filter **30** and a photoelectric conversion cell array **50**. The driver **1200** may electrically drive the optical path modulation optical element **10** to change a position of an image on the color filter **30** in a time division manner. The image sensor **150**, the driver **1200**, and the signal processor **1300** may be controlled by a controller **1100**.

[0049] Referring to FIG. **2**, the image acquisition apparatus may further include a main lens **70** configured to form an image of a subject. Herein, the color filter **30**, the photoelectric conversion cell array **50**, and the optical path modulation optical element **10** may form the image sensor **150**. In addition, the driver **1200** and the signal processor **1300** may also be included in the image sensor **150**. That is, the image sensor **150** may include the remaining components except for lens elements such as the main lens **70**. Accordingly, components of the image sensor **150** are not limited to the color filter **30** and the photoelectric conversion cell array **50** and may include some components of the image acquisition apparatus. FIGS. **1** and **2** show a case where the image sensor **150** includes the color filter **30** and the photoelectric conversion cell array **50**.

[0050] According to the image acquisition apparatus according to the present exemplary embodiment, the optical path modulation optical element **10** may be configured to be capable of electrically controlling an optical path such that an optical axis of an image output from the main lens **70** is moved or returned to a certain position, e.g., one pixel, on the color filter **30** according to an electrical signal. The optical path modulation optical element **10** may be driven by the driver **1200** so as to change a position of an image on the color filter **30** in a time division manner.

[0051] The optical path modulation optical element **10** may be configured such that an incident surface **10***a* and an exit surface **10***b* are parallel to each other. For example, an electrowetting prism having a quick response speed may be applied to the optical path modulation optical element **10**. In the image acquisition apparatus according to the present exemplary embodiment, the electrowetting prism may be configured such that incident and exit surfaces are parallel to each other and an inclination angle of an interface between first and second fluids having different refractive indices is controlled by an applied voltage. In this case, the electrowetting prism may be configured such that an incident position of an image on the color filter **30** is changed in at least one of, for example, horizontal and vertical directions by adjusting the inclination angle of the interface between the first and second fluids. By doing this, an incident position of an image may be shifted or returned in at least one of the horizontal and vertical directions in pixel units by electrically controlling the electrowetting prism.

[0052] The optical path modulation optical element **10** may include, for example, first and second electrowetting prisms **11** and **13**, each provided with a first fluid **11***a* or **13***b* and a second fluid **11***b* or **13***a*, as shown in FIG. **2**. The first and second electrowetting prisms **11** and **13** may be arranged along a traveling direction of light such that the first fluids **11***a* and **13***b* or the second fluids **11***b* and **13***a* having a same refractive index are close to each other. FIG. **2** shows a case where the first and second electrowetting prisms **11** and **13** are arranged such that the second fluids **11***b* and **13***a* of the first and second electrowetting prisms **11** and **13** are close to each other. In this case, when an interface between the first fluid **11***a* and the second fluid **11***b* of the first electrowetting prism **11** is a first interface **12**, and an interface between the first fluid **13***b* and the second fluid **13***a* of the second electrowetting prism **13** is a second interface **14**, the first interface **12** and the second interface **14** may be parallel to each other.

[0053] As described above, when the optical path modulation optical element **10** includes the first and second electrowetting prisms **11** and **13**, light incident to the optical path modulation optical element **10** and light output from the optical path modulation optical element **10** may be parallel to each other. In this case, the incident surface **10***a* of the optical path modulation optical element **10** corresponds to an incident surface of the first electrowetting prism **11**, and the exit surface **10***b* of the optical path modulation optical element **10** corresponds to an exit surface of the second electrowetting prism **13**.

[0054] The color filter **30** may have an arrangement of a plurality of types of filter elements **30**R, **30**G, and **30**B. For example, in the color filter **30**, an R filter element **30**R, a G filter element **30**G, and a B filter element **30**B may be arranged to form a two-dimensional (2D) array in pixel units, wherein each of the R, G, and B filter elements **30**R, **30**G, and **30**B corresponds to each color pixel in the image sensor **150**. For example, the color filter **30** may have a 2D arrangement of a color filter element basic unit including two G filter elements **30**G, one B filter element **30**B, and one R filter element **30**R arranged in a Bayer pattern. Additionally, the color filter **30** may have arrangements in which a plurality of types of color filter elements are variously arranged. For example, the color filter **30** may have a 2D arrangement of a color filter element basic unit including R, G, B, and W filter elements. Herein, the W filter element indicates white color and may correspond to a transparent pixel with no filter element. As another example, the color filter **30** may have a 2D arrangement of a color filter element basic unit including cyan (C), magenta (M), yellow (Y), and black (K) filter elements. As described above, the color filter